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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,129

08/11/2006

Tomoichiro Tamura

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EXAMINER

CARTON, MICHAEL

ART UNIT

PAPER NUMBER

4118

MAIL DATE

DELIVERY MODE

03/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,129	Applicant(s) TAMURA ET AL.	
	Examiner MICHAEL CARTON	Art Unit 4118	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/11/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 2 recites the limitation "said throttle apparatus" in line 4. Examiner suggests applicant use "said second throttle apparatus". For the purpose of examination, examiner has assumed applicant meant "said second throttle apparatus".

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lanciaux (US Patent No. 4621438) in view of Itoh (US Publication No. 2002/0046570).

With respect to claim 1, Lanciaux discloses a drying apparatus 10 (fig 1) comprising a heat pump apparatus 142 (fig 15) in which a refrigerant is circulated (column 5 lines 6-11) through a compressor 149 (fig 15), a radiator 150 (fig 15), a first throttle apparatus 152 (fig 15), a heat exchanger (see fig 16 below), and an evaporator 151 (fig 16), a circulation duct 144 (fig 12) through which drying air is circulated and in which said radiator 150 (fig 15), said heat exchanger (see fig 16 below) and said evaporator 151 (fig 16) are disposed in this order from upstream side of flow of the drying air and a drying room 130 (fig 12) connected to said circulation duct 144 (fig 12). Lanciaux does not disclose a second throttle apparatus nor the parts of the heat pump apparatus as located in the order stated above. Itoh discloses refrigerant flow in cooling/heating apparatus comprising a compressor 110 (fig 9), a radiator 130 (fig 9), a first

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throttle apparatus 162a (fig 9), a heat exchanger 150 (fig 9), a second throttle apparatus 161 (fig 9), and an evaporator 120 (fig 9) in this order (see paragraph 58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lanciaux with a compressor, a radiator, a first throttle apparatus, a heat exchanger, a second throttle apparatus, and an evaporator, in this order, as taught by Itoh for the purpose of minimizing the amount of liquid phase refrigerant sucked into the compressor.

With respect to claim 2, Lanciaux discloses an operating method of a heat pump apparatus in the drying apparatus according to claim 1, wherein said heat exchanger is used as a second evaporator or a second radiator by operating said first throttle apparatus and said throttle apparatus (column 10 lines 1-29).

With respect to claim 3, Lanciaux discloses the apparatus according to claim 1, further comprising discharge pressure detecting means for detecting discharge pressure of the compressor (column 6 lines 40-48), and throttle apparatus control means for controlling said first throttle apparatus and said second throttle apparatus using a detection value from said discharge pressure detecting means (column 10 lines 13-22).

With respect to claim 4, Lanciaux discloses the drying apparatus according to claim 1, further comprising discharge temperature detecting means for detecting discharge temperature of the compressor, and throttle apparatus control means for controlling said first throttle apparatus and said second throttle apparatus using a detection value from said discharge temperature detecting means (column 10 lines 13-22).

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4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lanciaux (US Patent No. 4621438) in view of Itoh (US Publication No. 2002/0046570) in further view of Honda (US Publication No. 2001/0018831).

With respect to claim 5, Lanciaux discloses all claimed elements of the drying apparatus according to claim 1, except for an air temperature detecting means for detecting inlet air temperature of said evaporator, and throttle apparatus control means for controlling said first throttle apparatus and said second throttle apparatus using a detection value from said air temperature detecting means. Honda discloses a heat pump controller system wherein an air temperature detecting means 28, 29, 32 (fig 2) for detecting inlet air temperature of said evaporator (paragraph 43), and throttle apparatus control means for controlling said first throttle apparatus 16 (fig 1) and said second throttle apparatus 17 (fig 1) using a detection value from said air temperature detecting means (paragraph 95 discloses capillary tubes 16 and 17 as throttles which respond to decompressing means paragraph 96 states the compressor is controlled by thermal load on vehicle interior which would correspond to temperature detecting means 28, 29, 32). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lanciaux with an air temperature detecting means for detecting inlet air temperature of said evaporator, and throttle apparatus control means for controlling said first throttle apparatus and said second throttle apparatus using a detection value from said air temperature detecting means as taught by Honda for the purpose of preventing the compressor from overworking, preventing failure.

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5. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lanciaux (US Patent No. 4621438) in view of Itoh (US Publication No. 2002/0046570) in further view of Sakakibara (US Patent No. 6494051).

With respect to claim 6, Lanciaux discloses all claimed elements of the drying apparatus according to claim 1, except for a high pressure side of said heat pump apparatus is operated as a supercritical state. Sakakibara discloses a high pressure side of said heat pump apparatus is operated as a supercritical state (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lanciaux with a high pressure side of said heat pump apparatus is operated as a supercritical state as taught by Sakakibara for the purpose of having a high heat exchange efficiency thus reducing power consumption.

With respect to claim 7, Lanciaux discloses all claimed elements of the drying apparatus according to claim 1, except for using carbon dioxide as the refrigerant. Sakakibara discloses a heat pump system where carbon dioxide is used as the refrigerant (column 7 lines 29-35). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lanciaux by using carbon dioxide as the refrigerant as taught by Sakakibara for the purpose of having a high heat exchange efficiency thus reducing power consumption.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL CARTON whose telephone number is (571)270-7837. The examiner can normally be reached on Monday-Friday 7:30am - 5pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571)272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. C./

Examiner, Art Unit 4118

/Frantz F. Jules/

Supervisory Patent Examiner, Art Unit 3744